REMARKS

These remarks follow the order of the paragraphs of the office action. Relevant portions of the office action are shown indented and italicized.

DETAILED ACTION

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-10 and 16-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 25 and 26 are rejected as indefinite since they are dependent upon themselves.

Claims 1 and 6, as amended, are still confusing as to what the metes and bounds of applicants invention is. Specifically, in claim 1, beginning at line 8, the phrase "wave generated from a sound source inherently corresponding to a sound source position and to enable recording and processing of acoustic data" is confusing in as much as it appears that the functions of recording and processing are now being attributed to the "sound reflecting element". Finally, the distinction between the "acoustic data" and the "delay information" needs clarification.

Also, with respect to claim 6, the preamble claims "said step (singular) of acquiring comprising". However, the discrepancy is the claim further claims additional steps. In claim 28, there appears to be a grammatical issue that needs clarification. The amendment specifies "forming a reflecting surface as an enveloping surface designed as an envelope made from at least one spheroid formed by rotating at least one of ellipse having two focal points corresponding to the sound source and the sound collecting mean respectively". Specifically, it is unclear what the "rotating at least one" refers to. Further, it is questioned what a "source position of a reflected wave of a direct wave" is.

Finally, with respect to claims 1, 6 and 28, it is questionable whether the "sound reflecting element" is in fact a structural component or a formation of an ambiguous "spheroid". If so, it is questioned what structure is actually being claimed and if no structure is claimed, it is questioned what the reflecting element embodies.

In response, the applicants respectfully states that claims 1, 2 and 6 are amended herewith to overcome all the rejections of Claims 1-10 and 16-28 under 35 U.S.C. 112, second paragraph. Each claim is definite and particularly points out and distinctly claims the subject matter which applicant regards as the invention.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-10 and 16-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shen ('152) in view of Benesty et al ('284).

In response, the applicant respectfully states that Claims 1-10 and 16-28 as being made obvious and non-patentable by the invention of Shen in view of Benesty.

The present invention as claimed in Claims 1-10 and 16-28,

> "Enables the estimation of a sound source position at an angle in a system with a small number of microphones, which was conventionally difficult to perform, and improve the precision of estimating the sound source position. By forming a reflecting surface RS as an enveloping surface of a spheroid in which a position of sound collecting means and a sound source position are the focal points, a major reflected wave having a delay amount corresponding to a sound source position is generated, and the delay amount between the direct wave and the reflected wave is checked, whereby the sound source position is acquired and estimated."

Whereas, the cited art to Shen, US Patent 6,185,152, filed: December 23, 1998, is entitled: "Spatial sound steering system". The Shen abstract reads:

> "An apparatus and method for determining directionality of acoustic signals arriving from an acoustic source is disclosed. A plurality of reflectors for modifying the acoustic signals and a transducer located proximate to the reflectors is used. A notch detector detects and identifies spectral notches in the modified acoustic signals. A device then determines the direction of the acoustic source. In one embodiment, a microphone system capable of detecting three-dimensional sound is provided. The microphone system comprises an elliptical-shaped microphone enhancer having at least two reflectors located different distances apart from a microphone located in the center of the ellipse. The reflectors have asymmetric ridges which cause interference patterns in the signals received by the microphone, conceptually analogous to the patterns generated by the pinnae of the human ear".

The further cited art to Benesty, US Patent 6,826,284, filed: February 4, 2000, is entitled: "Method and apparatus for passive acoustic source localization for video camera steering applications". The Benestry abstract reads:

> "A real-time passive acoustic source localization system for video camera steering advantageously determines the relative delay between the direct paths of two estimated channel impulse responses. The illustrative system employs an approach referred to herein as the "adaptive eigenvalue decomposition algorithm" (AEDA) to make such a determination, and then advantageously employs a "one-step least-squares algorithm" (OSLS) for purposes of acoustic source localization, providing the desired features of robustness, portability, and accuracy in a reverberant environment. The AEDA technique directly estimates the (direct path) impulse response from the sound source to each of a pair of microphones, and then uses these estimated impulse responses to determine the time delay of arrival (TDOA) between the two microphones by measuring the distance between the first peaks thereof (i.e., the first significant taps of the corresponding transfer functions). In one embodiment, the system minimizes an error function (i.e., a difference) which is computed with the use of two adaptive filters, each such filter being applied to a

corresponding one of the two signals received from the given pair of microphones. The filtered signals are then subtracted from one another to produce the error signal, which is minimized by a conventional adaptive filtering algorithm such as, for example, an LMS (Least Mean Squared) technique. Then, the TDOA is estimated by measuring the "distance" (i.e., the time) between the first significant taps of the two resultant adaptive filter transfer functions".

Shen discloses a system and method for sound source localization. Note that Shen discloses a sound reflecting element (see claim 4).
The difference between what is claimed in the instant independent claims 1, 6 and 28 and what is disclosed in Shen is the claims specify that "sound delay information" is utilized.

Benesty et al discloses a sound source localization system and method wherein the relative time delay between the arrival of an acoustic source signal at each of a pair of microphones is used to locate the sound source.

In view of Benesty et al, it would be obvious to one of ordinary skill in this art to modify the system and method of Shen to include time delay information for sound source localization. Claims 1, 6 and 28 are so rejected.
Dependent claims 2-06, 7-10 and 11-27 are further provided by the above noted combination of prior art.

In response, the applicants respectfully states that it is apparent that because of the claim rejections under 112, the Examiner failed to see the novelty of the claimed invention. The combined Benesty and Shen fail to teach or make obvious the steps, functions and/or structure of the Claims 1-10 and 16-28.

With the amendment of claims 1, 2, 6 and 28, it is apparent that the references do not make the claims obvious.

For example, the cited combination fails to teach or make obvious:

sound processing means :

for reflecting a sound wave generated from a sound source according to a sound source position;

for recording acoustic data collected with direct sound;

for converting said acoustic data into digital data for later processing and holding said acoustic data in a recording unit, and forming a new cue, said new sound cue being delay information generated by a physical sound reflecting element; and

for employing said delay information in addition to a conventional cue, not depending upon any particular kind of signal sound source,

the sound reflecting element for generating said delay information corresponding to a relative position between a sound source and a sound collecting means, said sound reflecting element having a sound reflecting surface, sound reflecting from said sound reflecting element to reflect a sound wave generated from the sound source inherently corresponding to the sound source position;

a storage part for recording and storing the acoustic data and said delay information generated by said sound reflecting element, and superimposing said delay information on the acoustic data, and

a sound source localization part for acquiring a sound source position, employing the acoustic data on which said delay information is superposed.

as in claims 1 [and 6], or

any sound source localization system, wherein said sound reflecting element is formed as a spheroid associated with the relative position between the sound source and sound collecting means to generate said delay information intrinsic to said relative position, wherein a reflecting surface of the sound reflecting element is designed as an envelope made from a plurality of virtual spheroids formed by rotating a plurality of ellipses having two focal points corresponding to the sound source and the sound collecting mean around an axis connecting the focal points, said plurality of ellipses being generated in relation

with an elevation between the sound source and the sound collecting means and being flatter as the elevation is greater, said reflecting surface being an enveloping surface of the plurality of virtual spheroids generated by rotating a corresponding ellipse around the axis connecting the focal points.

as in claim 2.

Thus claims 1-28 are not obvious and are allowable as amended herewith.

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Respectfully submitted,

By: _____/Louis Herzberg/_____

Dr. Louis P. Herzberg
Reg. No. 41,500
Voice Tel. (845) 352-3194
Fax. (845) 352-3194

3 Cloverdale Lane
Monsey, NY 10952

Customer Number: 54856